to the conclusion that fertility is inherited in man and fecundity in the horse, and, therefore, probably that both these characters are inherited in all types of life. It would, indeed, be difficult to explain by evolution the great variety of values these characters take in allied species if this were not true. That they are inherited according to the Galtonian rule seems to us very probable, but not demonstrated to certainty. It is a reasonable hypothesis until more data are forthcoming.

The memoir concludes with a discussion of the meaning of reproductive selection for the problem of evolution and with sixteen correlation tables, giving the dressed material on which our conclusions are based.

THE NEW YORK MEETING OF THE AMERICAN PHYSIOLOGICAL SOCIETY.

THE American Physiological Society held its eleventh annual meeting in New York, December 28, 29 and 30, 1898. The first day's sessions were held at the physiological laboratories of the College of Physicians and Surgeons, the medical school of Columbia University. The forenoon session of the second day consisted of a joint meeting of the Society and the American Psychological Association at Schermerhorn Hall, Columbia University; in the afternoon the members attended at the same place the joint meeting of the Affiliated Scientific Societies. The sessions of the third day were held at the physiological laboratories of the University and Bellevue Hospital Medical College. In attendance and the number of papers presented the meeting was the most successful yet held, and demonstrated the fact that a large amount of research in physiology is being carried on in the laboratories of this country.

The forenoon session of Wednesday, the first day, was devoted largely to the presentation of the chemico-physiological communications. Professor J. J. Abel (Johns Hopkins) discussed 'Epinephrin, the active constituent of the suprarenal capsule, and its compounds.' He has succeeded in isolating from the suprarenal capsule a specific chemical body which produces the peculiar physiological effects heretofore recognized with extracts of the capsule. He has carefully determined its chemical properties and classes it with the alkaloids with the formula $C_{17}H_{15}NO_4$. Drs. J. B. Wallace and W. Mogk, through Professor G. C. Huber, presented a report of an experimental study upon the 'Action of suprarenal extract on the mammalian heart,' performed in the laboratory of Professor A. R. Cushny (Michigan University). The extract was found to stimulate the vagus center, thus inhibiting the heart, to stimulate the heart muscle directly and to cause a constriction of the systemic arterioles. Dr. Walter Jones (Johns Hopkins) and Professor R. H. Chittenden (Yale) reported the results of independent investigations of the melanines, the black pigment occurring in hair and in the skin of the negro. The former obtained the pigment from black horsehair by treatment with hydrochloric acid. Fusing with caustic potash gave a sulphur melaninic free, which when oxidized in an alkaline medium is easily decomposed into carbonic acid and ammonia, but in an acid medium yields certain more complex bodies. The facts presented by Professor Chittenden tended to show that melanines or melanine-like pigments can be prepared artificially from antialbumid and hemipeptone by long heating with 10% sulphuric acid at 100°C. The exact composition of the melanine thus formed depends largely upon the extent of the hydrolytic cleavage of the proteid. By invitation, Dr. Beattie Nesbitt (Toronto) read a paper on 'The presence of cholin and neurin in the intestinal canal during its complete

obstruction.' His experiments lead to the belief that complete occlusion of the small intestine at its lower end will give rise to the occurrence of cholin, neurin, and, perhaps, other bases, provided the food taken contains a considerable quantity of lecithin. Cholin is only slightly, neurin powerfully, toxic. Professor W. T. Porter (Harvard) reported further 'Experiments on the mammalian heart.' Experiments on the isolated ventricles supplied with blood through the coronary arteries and cut in various directions show that the synchronism of the ventricles is not dependent on nerve-cells, is probably maintained through muscular and not through nervous connections, and is not a function of the auricles, but is managed by the ventricles themselves. Dr. Reid Hunt (Johns Hopkins) gave an account of his extended researches on 'Direct and reflex acceleration of the mammalian heart.' The accelerator nerves exert a tonic action upon the heart. The accelerator centers show greater resistance to the action of drugs, etc., than do the cardio-inhibitory or the vaso-motor centers. Continued stimulation of the accelerator nerves causes genuine fatigue in the heart, and, if long continued, even death. Reflex acceleration is due usually, if not always, to an inhibition of the tonic activity of the vagi.

Dr. S. J. Meltzer (New York) opened the afternoon session with a paper on 'The causes of the orderly progress of the peristaltic movements in the œsophagus.' The author's experiments tend to harmonize the statement of Mosso, who found that division of the œsophagus does not prevent the progress of the peristalsis below the cut and concluded that the peristalsis is of central origin, and the statement of Wild, who found peristalsis to cease at the cut and inferred that its progress is of peripheral origin. The author proved that the difference in the results was due to the fact that Wild experimented on animals under deep anæsthesia, while Mosso's animals were only lightly anæsthetized.

The greater part of the afternoon session was devoted to demonstrations and the exhibition of new apparatus. Professor G. Carl Huber (Michigan University) demonstrated methylene-blue preparations of sensory nerve-endings in tendon — Golgi's tendon corpuscles. Professor W. T. Porter (Harvard) demonstrated the coordination of the ventricles in the mammalian heart. The following exhibitions of apparatus were made: A convenient form of non-polarizable electrode, by Professor W. H. Howell (Johns Hopkins); new laboratory apparatus, by Dr. E. W. Scripture (Yale); an improved form of Ellis's piston recorder, by Professor W. P. Lombard (Michigan University); a simple etherizing bottle, by Dr. C. C. Stewart (Columbia); a simple oncometer, by Professor F. S. Lee (Columbia); a new respiration apparatus, by Professor F. S. Lee.

The papers presented at the joint session of the Society and the American Psychological Association on the forenoon of Thursday, the second day, were calculated to interest both physiologists and psychologists. After an address of welcome by Professor Münsterberg, the President of the Psychological Association, Professor Chittenden, the President of the Physiological Society, was called to the chair and the prepared program was entered upon. Professor J. McK. Cattell (Columbia) gave a descriptive exhibition of instruments for the study of movement and fatigue. Professor F. S. Lee (Columbia) presented the results of an extended series of experiments upon 'The nature of muscle fatigue.' The course of fatigue in the muscles of the frog, the turtle and the cat shows certain differences, the common element being a decrease of lifting power. The chief cause of muscle fatigue appears to be poisoning by fatigue substances. Fatigue is a protective phenomenon, pre-

venting the oncoming of exhaustion. Professor G. Carl Huber (Michigan) reported his 'Observations on the innervation of the intracranial vessels.' In the pia mater and the cranial dura mater of the dog, cat and rabbit two kinds of nerves were found, sensory and vasomotor, the former being medullated, the latter non-medullated. The latter were found to terminate in the muscular wall of the arteries. Professor C. F. Hodge (Clark University) reported upon a research undertaken with Mr. H. H. Goddard to test the possible amœboid movements of cortical nerve-cells. The brains of rested and fatigued animals were compared. All the experiments in which definite results were obtained confirmed Demoor's results, showing a contracted and varicose condition of the dendrites, and, moreover, extend our knowledge to include effects of normal fatigue. The experiments were fully controlled, the control specimens showing dendrites and contact granules uniformly expanded. Dr. G. W. Fitz (Harvard) exhibited a new chronoscope, in which the time is measured by the fall of water within a graduated glass tube. A valve at the lower end of the tube is opened and closed by electro-magnets connected with the keys of the reaction apparatus. By invitation Professor O. N. Rood (Columbia) exhibited his flicker photometer. Professor Münsterberg discussed 'The physiological basis of mental life.' Professor G. T. W. Patrick (Iowa) discussed 'The confusion of tastes and odors.' Dr. E. W. Scripture gave an exhibition of methods of demonstrating the physiology and psychology of color.

At the joint meeting of the Affiliated Societies, on Thursday afternoon, in the discussion upon 'Advances in methods of teaching,' Professor W. T. Porter read a paper upon 'The teaching of physiology in medical schools.'

At the first session on Friday, the third day, Professor Chittenden exhibited a convenient form of sphygmograph. Professor Graham Lusk (University-Bellevue), reported for Mr. W. H. Parker on 'The maximum production of hippuric acid in rabbits.' If benzoic acid be fed to rabbits in quantity just sufficient to unite with the glycocoll formed in the animal, the nitrogen that is excreted in the hippuric acid is in a fixed ratio of about 1 : 20 to the total nitrogen of the urine. This indicates that about 5 % of the nitrogen of proteid may be eliminated in the form of glycocoll. The latter is probably a cleavage product of proteid to this extent. Professor Chittenden presented the results of 'A chemico-physiological study of certain derivatives of the proteids.' The paper dealt especially with the results obtained in a careful study of the physiological action of a large number of specific cleavage products of proteids when introduced directly into the circulation. Antipeptone, antialbumid, antialbumoses, protogelatose, deterogelatose, pure gelatine peptone and so-called hemipeptone were among the products studied. The influence on the blood-pressure, blood-coagulation, immunity, lymph flow, urinary secretion, etc., were all carefully studied and results of interest were obtained. Professor G. N. Stewart (Western Reserve) presented the results of numerous experiments on 'The molecular concentration and electrical conductivity of certain animal liquids with special reference to blood.' Professer H. P. Bowditch (Harvard) read for Dr. J. K. Mitchell a paper on 'The influence of massage upon the number of blood globules in the circulating blood.' In health massage increases the number of red corpuscles and to some extent their hæmoglobin value. In anæmia there is a very constant and large increase in the number of red corpuscles after massage. Anæmia may be due to a lack of activity or availability in the corpuscles. Dr. P. A. Levene (New York)

gave the results of his investigations on the tissues of the higher animals as to their power of combining iodide intramolecularly. After administering potassium iodine to fowls and analyzing during ten weeks the eggs and later the tissues, he concludes that the power of combining iodine in the organism belongs only to certain keratins, such as that of the hair, to certain proteids, such as that of the thyroid gland, and to certain fats. Professor Wesley Mills (McGill) spoke of the 'Correlation of the functional and anatomical development of the cerebrum.' Professor Chittenden reported progress in the investigation of the properties of the edible and poisonous fungi which was undertaken by a committee of the Society appointed for this purpose two years ago.

At the afternoon session on Friday, Professor G. Carl Huber presented 'A note on the sensory nerve-endings in the extrinsic eye-muscles of the rabbit—atypical motor endings of Retzius. The author has repeatedly observed these nerve-endings and gave reasons for believing them to be sensory and not motor. In the absence of Professor L. B. Mendel (Yale), a paper by him, on 'The paths of absorption from the peritoneal cavity,' was read by the President. In a number of experiments upon absorption it was observed that the solution employed appeared in the urine considerably earlier than in the lymph. The author is inclined to the blood-vessel theory of absorption. Drs. P. A. Levene and I. Levin (New York), made a preliminary communication on the absorption of the proteids. Because of their easy identification iodoproteids were studied, being injected into a loop of the intestine and later sought for in the lymph. The results were negative and in so far tend to confirm the accepted theory of absorption by the blood system. By invitation Professor E. O. Jordan (Chicago) gave the results of experiments upon 'The production of fluorescent pigment by bacteria.' The presence of both phosphorus and sulphur is essential to the formation of this pigment. The relative fluorescigenic values of a variety of chemical bodies were studied. The presence of acid and diffuse daylight are unfavorable to pigment production. Professor C. F. Hodge described for Mr. H. H. Goddard a new brain microtome which is constructed on two new principles: the knife, which is stationary, is level in order to carry liquid in which the section floats, and the brain is moved against the knife. By invitation Dr. L. J. J. Muskens (New York) exhibited an instrument for measuring muscular tonicity in man.

In addition to the above papers, a number of others were read by title. The following were elected members of the Society: Professor W. O. Atwater (Wesleyan), Professor S. P. Budgett (Washington), Dr. A. M. Cleghorn (Harvard), Dr. W. J. Gies (Columbia), Professor W. S. Hall (Northwestern), Dr. Walter Jones (Johns Hopkins), Professor E. O. Jordan (Chicago), Dr. A. P. Mathews (Tufts), Professor B. Moore (Yale), Dr. C. C. Stewart (Columbia) and Professor F. F. Westbrook (Minnesota). There were elected as members of the Council for 1898–'99: Professors Chittenden, Howell, Lee, Lombard and Porter. The details of the establishment of the *American Journal of Physiology*, under the auspices of the Society, were presented and made a part of the records. The *Journal*, now in its second volume, has abundantly justified its existence.

FREDERIC S. LEE,
Secretary.

SCIENTIFIC BOOKS.

The Discharge of Electricity through Gases. By J. J. THOMSON. New York, Charles Scribner's Sons. 1898. Small 8vo. Pp. 203. Price, $1.00.

This volume contains, in modified form, the four lectures delivered by Professor Thomson